Missouri 2005 $PM_{2.5}$ Summary and Proposed New PM Standards
April 27, 2006

States have been collecting fine particulate matter ($PM_{2.5}$) ambient air monitoring data since 1999. $PM_{2.5}$ are particles less than 2.5 microns in diameter, small enough to be deeply inhaled into the lungs. They have been identified with health issues including premature death and increased hospital admissions, which is why EPA promulgated National Ambient Air Quality Standards (NAAQS) for $PM_{2.5}$ in 1997.

2005 $PM_{2.5}$ Annual Data

The annual standard is 15.0 $\mu g/m^3$, based on a three year average of the annual mean concentration at each site. Monitoring data collected by MDNR and IEPA show the St. Louis area in violation of the $PM_{2.5}$ annual NAAQS.

- 2003-5 Two sites were in violation.
  Granite City, IL 17.0 $\mu g/m^3$
  E. St. Louis, IL 15.5 $\mu g/m^3$

- St. Louis, MO annual averages, which had steadily decreased since 1999, increased dramatically in 2005.

1999	Blair St.	17.3 $\mu g/m^3$
2000	Blair St.	16.4 $\mu g/m^3$
2001	Blair St.	15.2 $\mu g/m^3$
2002	Blair St.	15.4 $\mu g/m^3$
2003	Blair St.	14.1 $\mu g/m^3$
2004	Blair St.	13.1 $\mu g/m^3$
2005	Blair St.	16.1 $\mu g/m^3$

2005 $PM_{2.5}$ 24-Hour Data

The current 24-hour NAAQS is 65 $\mu g/m^3$, 98th percentile of the yearly data, averaged over three years.

- No sites in Missouri or the St. Louis area violated the current 24-hour $PM_{2.5}$ NAAQS.

$PM_{2.5}$ Speciation Data

Shortly after monitoring for compliance with the $PM_{2.5}$ NAAQS began, monitoring for $PM_{2.5}$ species was also initiated. These data tell us what particular species of $PM_{2.5}$ are involved in the total $PM_{2.5}$ concentrations. We are able to use this information to provide insight into the sources and potential control measures for $PM_{2.5}$.

- In 2005, $PM_{2.5}$ levels were higher than in 2004 during all four quarters of the year. Most of the difference in $PM_{2.5}$ levels was due to increases in Nitrates and Sulfates.

- During 2005, meteorological conditions may have caused an increase in transported pollutants and limited dispersal of pollutants.

Attainment of the $PM_{2.5}$ Annual NAAQS

We have been working with IEPA, DOT, local planning and stakeholders to develop a State Implementation Plan (SIP) to comply with the $PM_{2.5}$ annual NAAQS. To do so, we are developing emissions inventories, conducting photochemical modeling and conducting source analysis using monitoring data. We must submit a SIP by April 2008, which will include a demonstration documenting how we will attain the NAAQS.

Particulate Matter Standards Review

By court order, the EPA must finalize a review of particulate matter standards by September 15, 2006. On January 17, 2006, the EPA proposed changing the level of the 24-hour $PM_{2.5}$ NAAQS.

- The EPA Administrator proposed to reduce the 24-hour NAAQS to 35 $\mu g/m^3$, 98^{th} percentile of data. Currently, two sites in Missouri have design values over 35 $\mu g/m^3$, Clayton Animal Shelter and Arnold, as well as four Illinois sites: VFW (Granite City), Granite City Fire Station, E. St. Louis, and Alton. The remaining sites are near, but below the proposed NAAQS. In Kansas City, the Troost, UMKC, and JFK (KS) sites have averages over 30 $\mu g/m^3$ and may be vulnerable. Among Outstate sites, only Ste. Genevieve and St. Joseph have averages over 30 $\mu g/m^3$.

- Despite the recommendation of the Clean Air Science Advisory Committee and EPA technical staff, the EPA Administrator proposed to not lower the annual NAAQS.

- The EPA administrator also did not follow the recommendation of his staff to propose a short-term (four to eight hour) secondary daytime visibility standard in urban areas.

Coarse Particulate Matter ($PM_{10-2.5}$) Standards Proposal

On January 17, 2006, the EPA Administrator also proposed a new standard for particulate matter, $PM_{10-2.5}$ (particles between 10 and 2.5 micrometers in diameter) or PMCoarse.

- The PMCoarse standard will replace the existing PM_{10} standard. The level and form of the standard are 70 $\mu g/m^3$, three-year average of 98^{th} percentile 24-hour values. There is no annual average standard proposed. By court order, the rule will be finalized in September 2006.

- The proposed rule is defined so as to monitor only PMCoarse attributed to urban industry and resuspended road-dust. Agricultural and mining sources are excluded. The standard will apply only in cities with a core urban population of 100,000 or greater.

- The proposed regulation includes a provision that sites currently in violation of the PM_{10} standard in urban areas, including St. Louis, will not be relieved of their PM_{10} compliance burdens. We are working to resolve compliance issues related to the North Market site in St. Louis so that the PM_{10} standard can be retired in Missouri if this proposal is promulgated as proposed.

Fine Particulate Matter

- What is Fine Particulate Matter ($PM_{2.5}$) - particles less than 2.5 μm in diameter, small enough to be deeply inhaled into the lungs. May cause premature death and increased hospital admissions.
- What are the sources of $PM_{2.5}$ - Motor vehicles, power plants, wood furnace, diesel engines, charcoal kilns, etc.
- What are the $PM_{2.5}$ standards - see next page

Fine Particulate Matter

The annual standard is 15 $\mu g/m^3$, based on a three year average of $PM_{2.5}$ concentration at each monitoring site. Data collected indicate that St. Louis is in violation of the annual NAAQS for $PM_{2.5}$.

- Granite City, IL 17.0 $\mu g/m^3$

  E. St. Louis, IL 15.5 $\mu g/m^3$

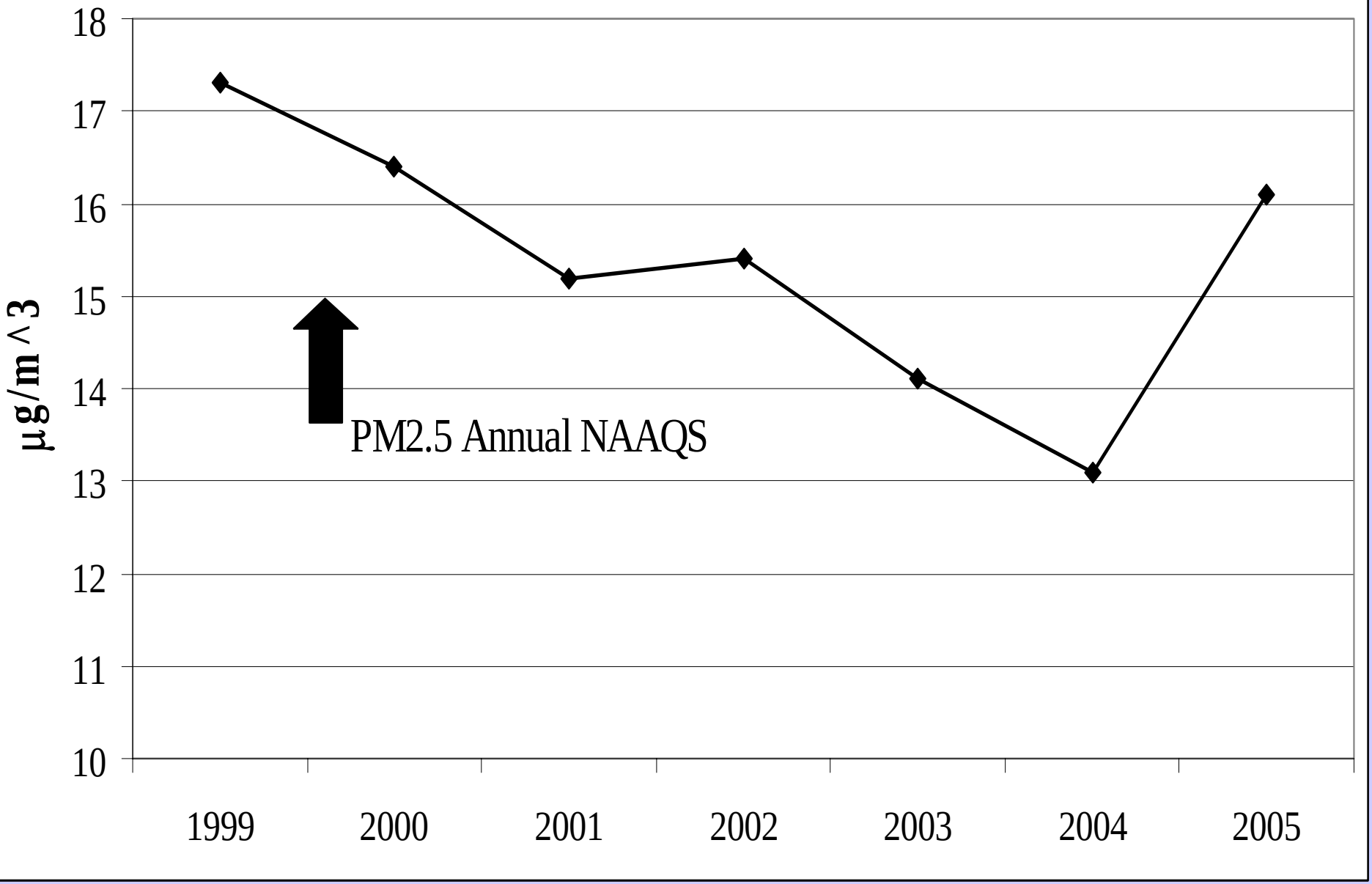
- Annual average has steadily decreased since 1999 until 2005.
- Blair St. Site

1999	17.3 $\mu g/m^3$
2000	16.4 $\mu g/m^3$
2002	15.4 $\mu g/m^3$
2003	14.1 $\mu g/m^3$
2004	13.1 $\mu g/m^3$
2005	16.1 $\mu g/m^3$

The 24-hour $PM_{2.5}$ standard is 65 $\mu g/m^3$

- No sites in Missouri are in violation of the current 24-hour standard

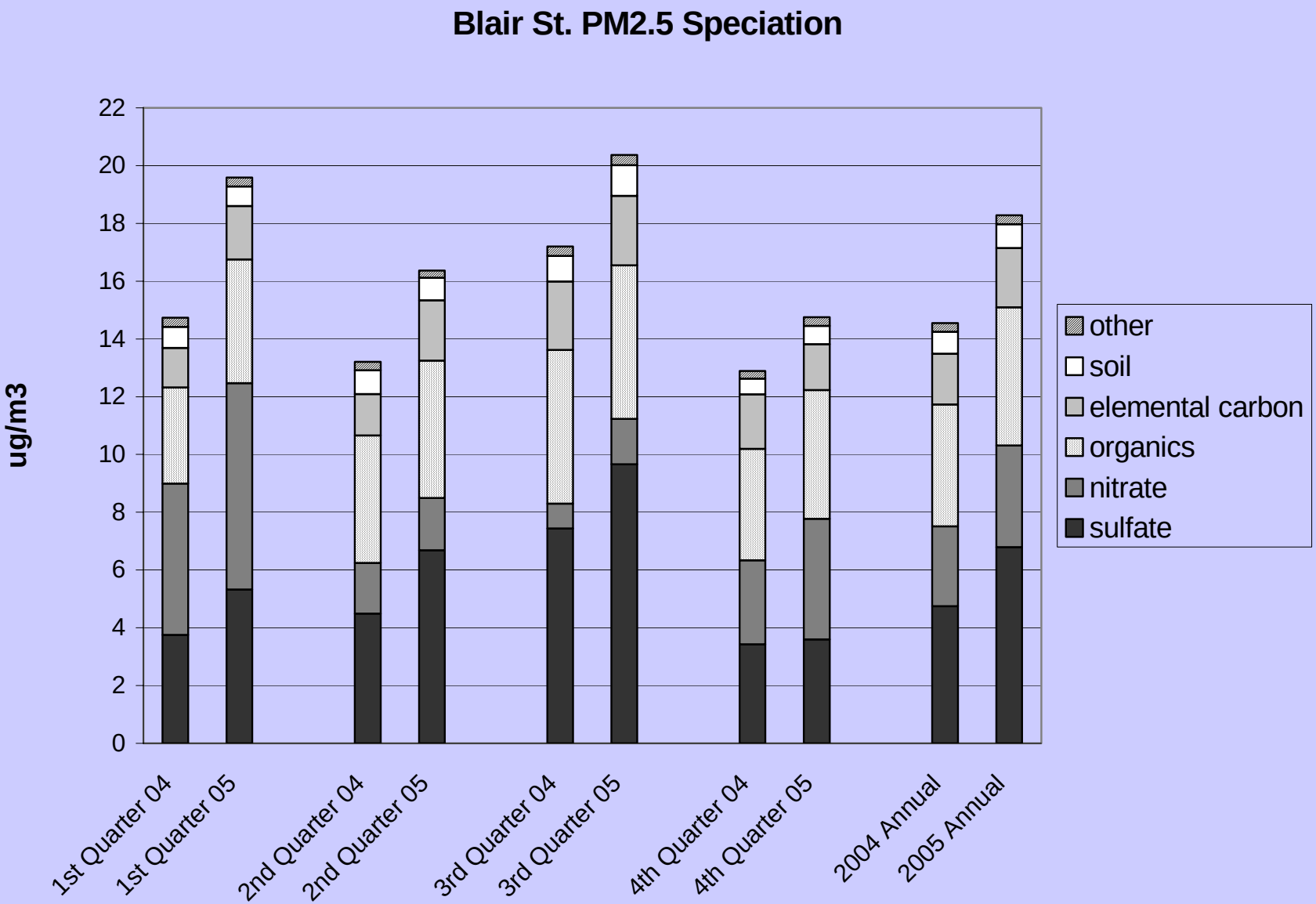
$PM_{2.5}$ Annual Averages - Blair St, St. Louis, MO 1999-2005



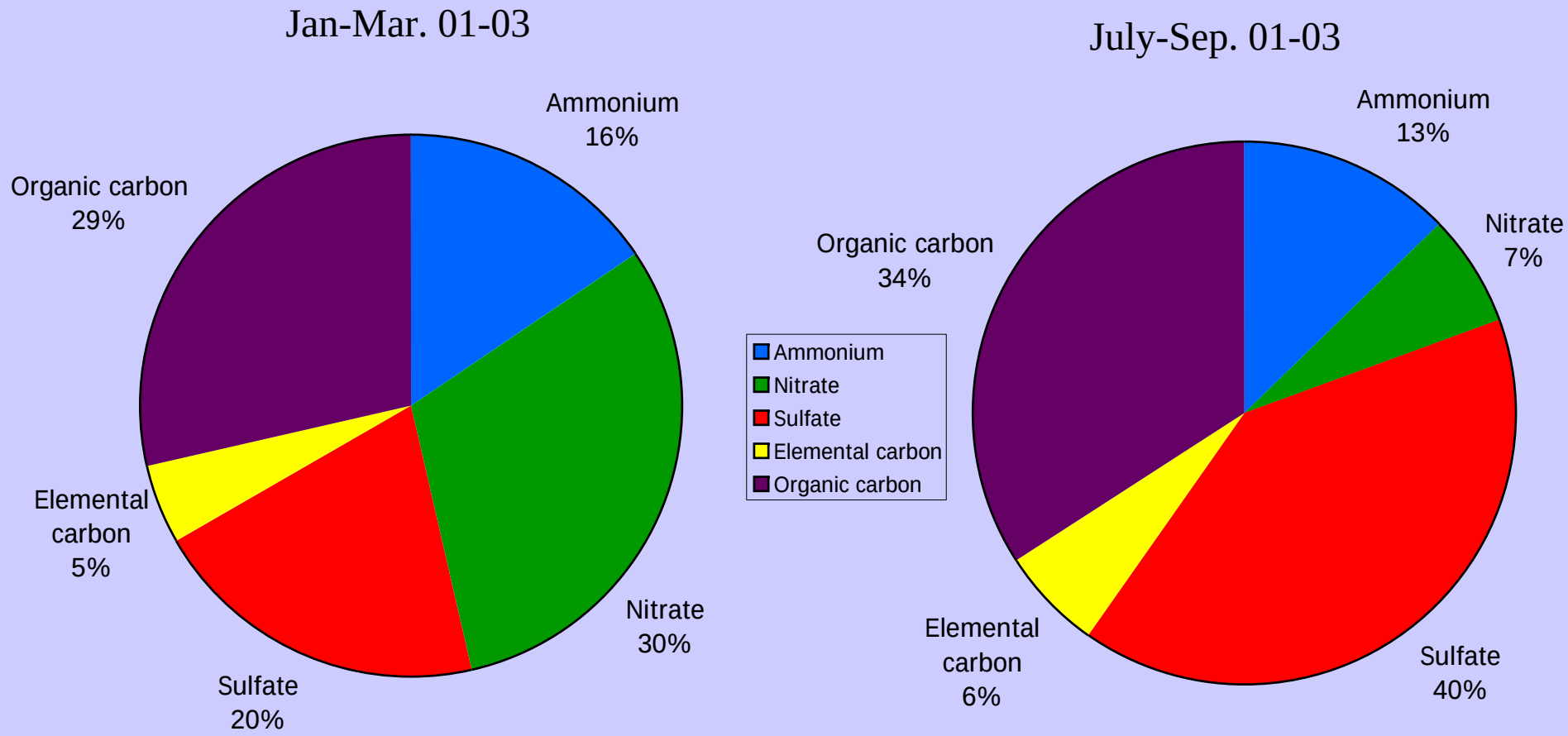
Annual $PM_{2.5}$ Total Mass for 2002-2005

	24-hr Std = 65 μg/m³ 98th percentile				Three Year Averages		Annual Mean Std = 15.0 μg/m³				Three Year Averages	
	98th percentile						Annual Mean					
Missouri	**2002**	**2003**	**2004**	**2005**	**02-04**	**03-05**	**2002**	**2003**	**2004**	**2005**	**02-04**	**03-05**
West Alton	35.0	35.5	30.2	38.5	33.6	34.7	14.0	14.0	11.9	**15.2**	13.3	13.7
Margaretta	35.5	31.5	26.5	40.0	31.2	32.7	14.3	13.5	12.1	**15.1**	13.3	13.6
Blair Street	36.5	32.0	27.9	40.3	32.1	33.4	**15.4**	14.1	13.1	**16.1**	14.2	14.4
South Broadway	36.5	33.2	28.5	38.6	32.7	33.4	**15.3**	14.4	13.4	**15.9**	14.4	14.6
Mound Street	35.9	33.2	30.3	40.8	33.1	34.8	**15.6**	14.7	13.1	**15.9**	*	*
Clayton	36.9	33.2	33.7	43.5	34.6	**36.8**	14.6	13.6	12.6	**15.5**	13.6	13.9
Sunset Hills	34.0	30.5	32.6	38.3	32.4	33.8	13.0	13.0	11.9	**15.5**	12.6	13.5
Arnold	46.5	37.2	34.8	41.7	**39.5**	**37.9**	**15.1**	13.9	12.5	**15.4**	13.8	13.9
Illinois												
VFW	44.6	38.0	35.3	41.2	**39.3**	**38.2**	**19.6**	**18.1**	**16.2**	**18.9**	*	*
Granite City	42.9	40.8	35.4	44.1	**39.7**	**40.1**	**17.7**	**17.5**	**15.4**	**18.2**	**16.9**	**17.0**
Alton	34.5	31.5	28.9	45.1	31.6	**35.2**	14.7	14.0	11.5	**16.0**	13.4	13.8
Wood River	33.9	31.6	30.0	41.2	31.8	34.3	**15.1**	14.0	13.2	**16.0**	14.1	14.4
E. St. Louis	40.9	32.6	30.2	39.6	34.6	34.1	**16.6**	14.8	14.7	**17.1**	**15.4**	**15.5**
Swansea	37.2	34.2	26.6	37.9	32.7	32.9	**15.1**	14.3	13.2	**16.0**	14.2	14.5

* - middle scale site – not for comparison to annual average


Blair St. PM2.5 Speciation
ug/m3
22
20
18
16
14
12
10
8
6
4
2
0
1st Quarter 04
1st Quarter 05
2nd Quarter 04
2nd Quarter 05
3rd Quarter 04
3rd Quarter 05
4th Quarter 04
4th Quarter 05
2004 Annual
2005 Annual
other
soil
elemental carbon
organics
nitrate
sulfate

PM Species at Blair Street Monitor



$PM_{2.5}$ Attainment Demonstration SIP

- We are working with IEPA, EPA Region V & VII, DOT, Local Planning Org, and stakeholders to develop control strategies for the $PM_{2.5}$ Attainment SIP which is due April 2008.
- Schedule:
  - Feb 15, 2005 - Effective date of final designation
  - Nov 30, 2006 - Complete base case evaluation
  - June 30, 2007 - Complete attainment demonstration
  - Sep 17, 2007 - File proposed control strategy rules
  - Oct 25, 2007 - Conduct public hearing for rules, MACC Adoption in Nov.
  - Feb 28, 2008 - Conduct public hearing for SIPs, MACC Adoption in Mar.
  - April 5, 2008 - Submit $PM_{2.5}$ SIP to EPA

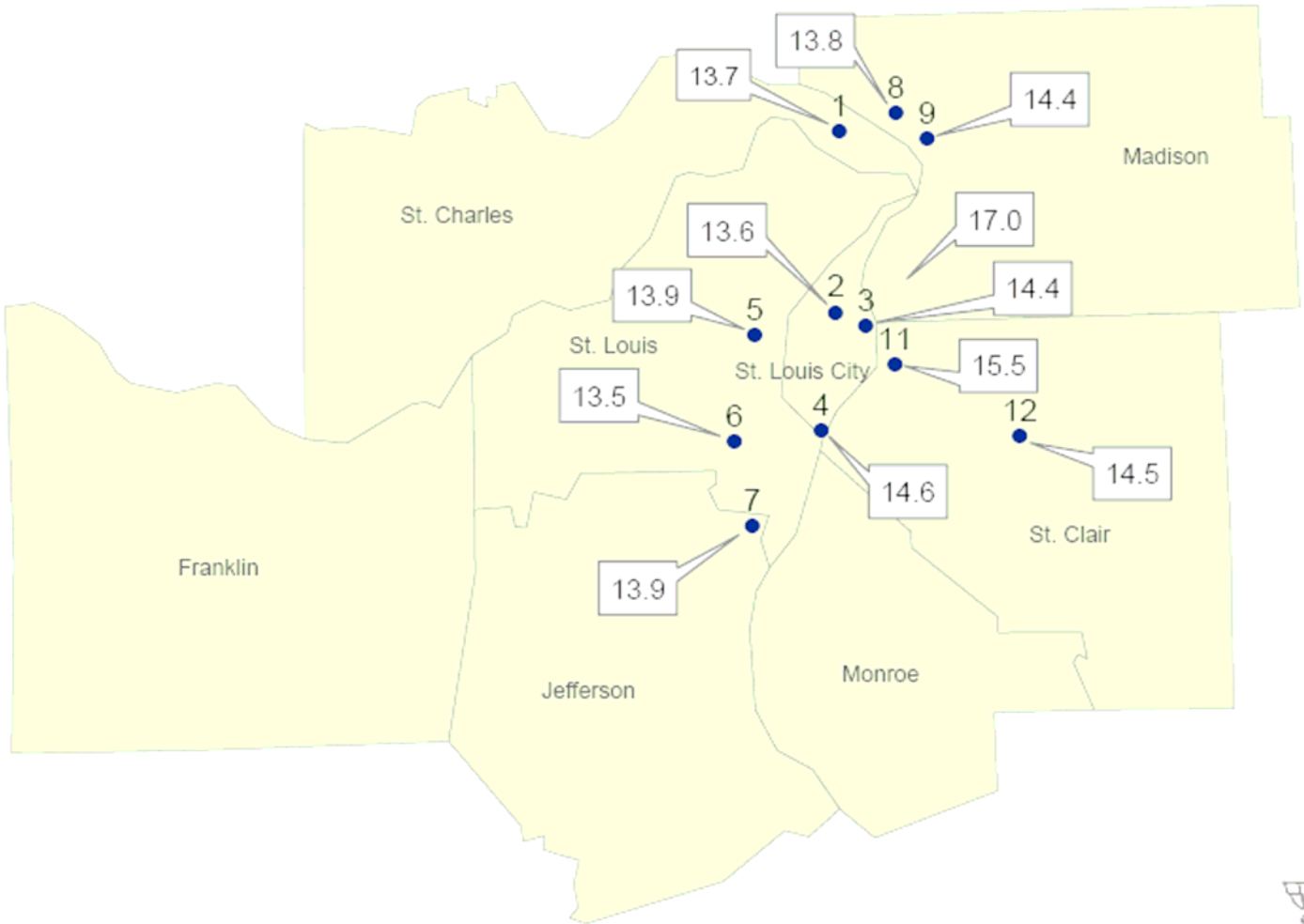
Revised PM Standards

- On December 15, 2005, the EPA proposed a change in the 24-hour $PM_{2.5}$ standard, from 65 to 35 $\mu g/m^3$. By court order, a rule must be finalized in September 2006.

- The EPA also proposed to introduce a 24-hour PMCoarse ($PM_{10-2.5}$) standard of 70 $\mu g/m^3$ and eliminate the PM_{10} NAAQS. This new standard would only be in effect in urban areas of 100,000 population or greater, and would not apply to agricultural or mining sources.

Spatial Distribution of PM2.5 in the St. Louis Area

2003 - 2005 Average Concentration in Micrograms per Cubic Meter



Site Name

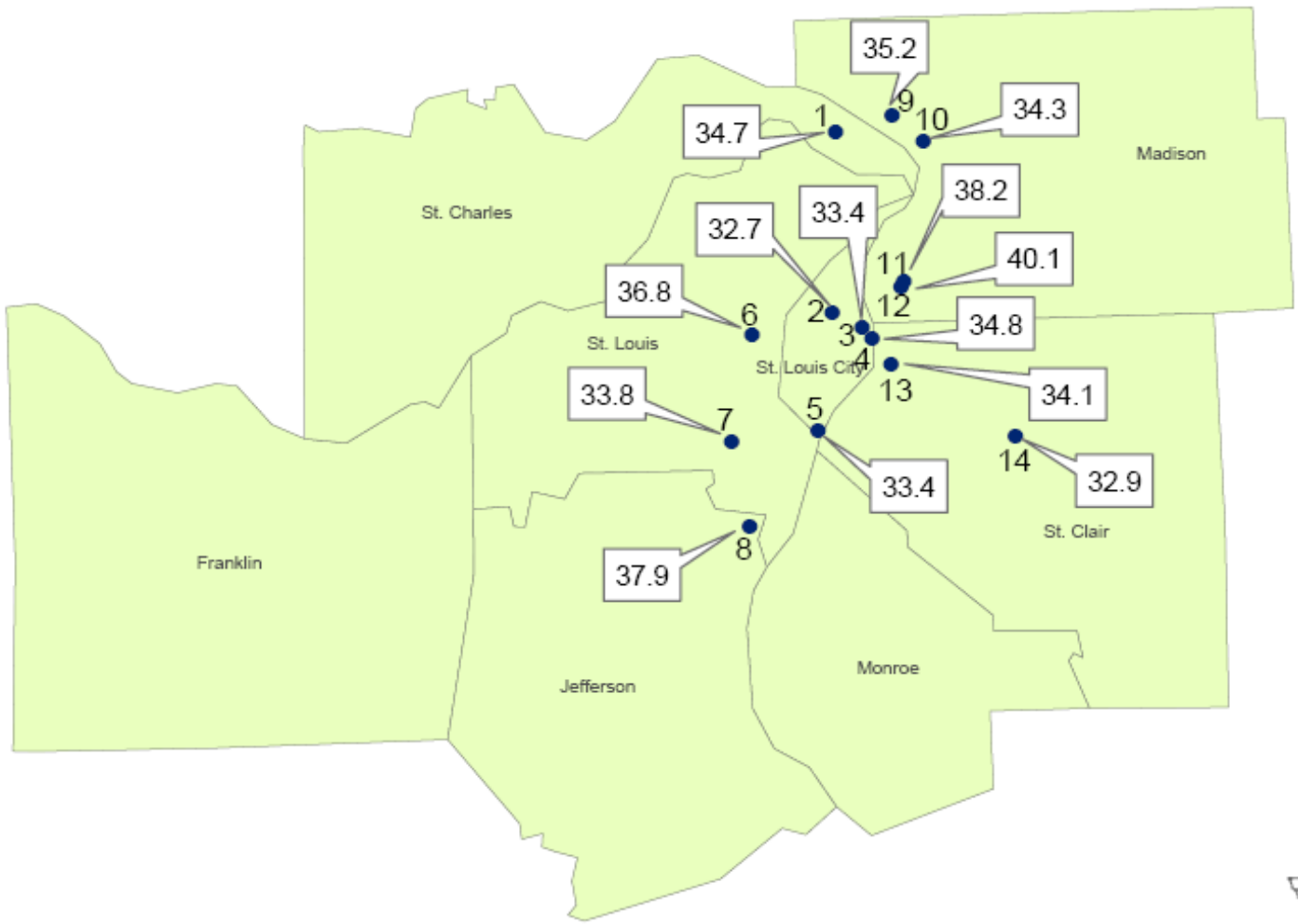
1 West Alton
2 Margaretta
3 Blair Street
4 South Broadway
5 Clayton
6 Sunset Hills
7 Arnold
8 Alton
9 Wood River
10 Granite City
11 East St. Louis
12 Swansea

N

Department of Natural Resources
Division of Environmental Quality
Air Pollution Control Program
(Patriola Mallro 03/27/08)

Spatial Distribution of 24-hour PM2.5 in the St. Louis Area

2003 - 2005 98th Percentile Concentration in Micrograms per Cubic Meter



Site Name

1 West Alton
2 Margaretta
3 Blair Street
4 Mound Street
5 South Broadway
6 Clayton
7 Sunset Hills
8 Arnold
9 Alton
10 Wood River
11 VWF
12 Granite City
13 East St. Louis
14 Swansea

N

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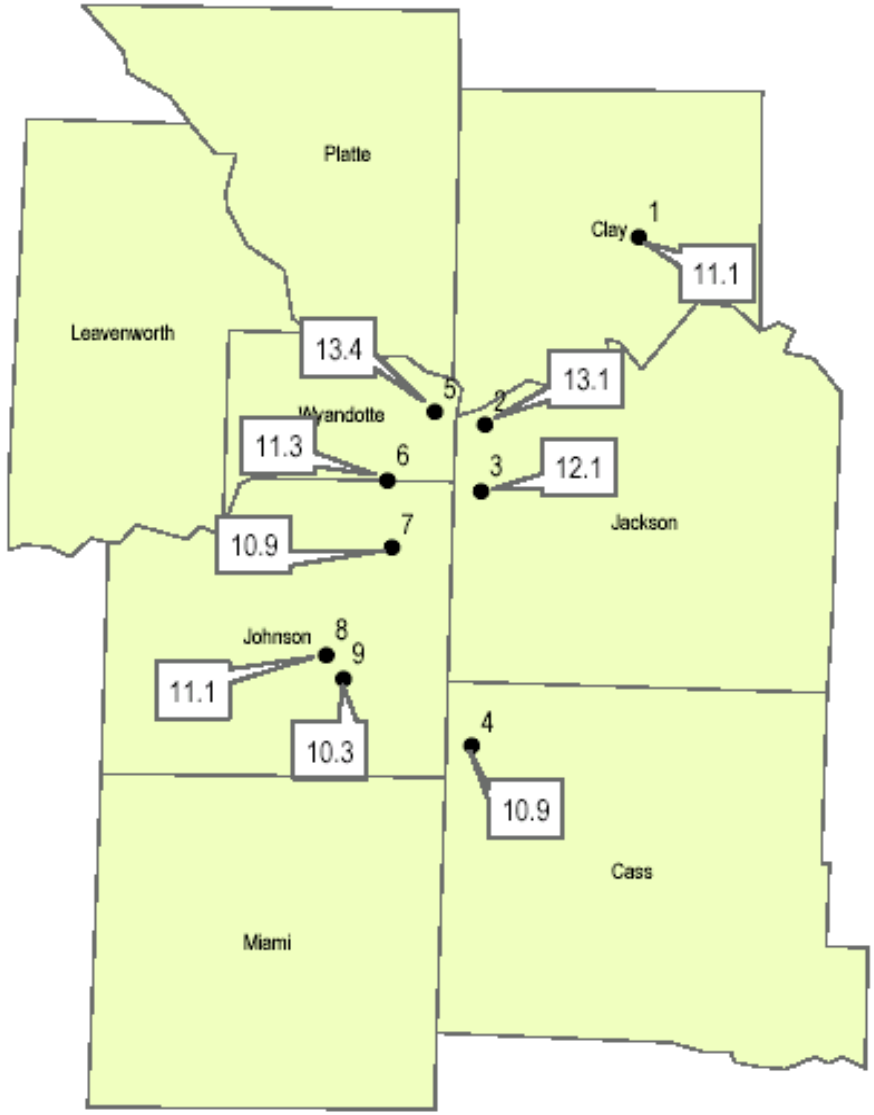
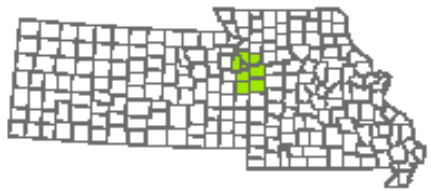
Spatial Distribution of PM2.5 in the Kansas City Area

2003 - 2005 Average Concentration in Micrograms per Cubic Meter



Site	Name
1	Liberty
2	Troost
3	UMKC
4	RG-South
5	JFK
6	Highland
7	Justice Center
8	Oxford
9	BlackBob



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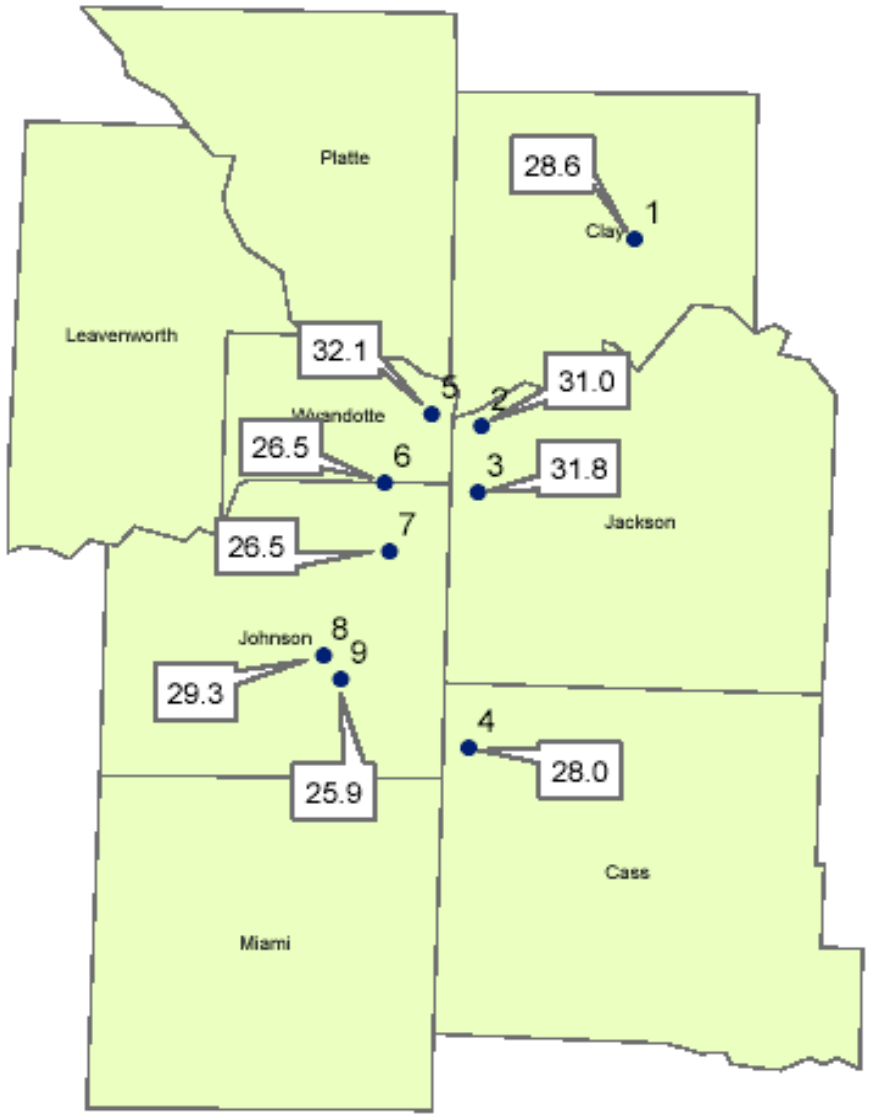
Spatial Distribution of 24-hour PM2.5 in the Kansas City Area

2003 - 2005 98th Percentile Concentration in Micrograms per Cubic Meter



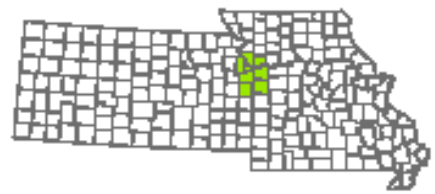
Site Name

Missouri

1	Liberty
2	Troost
3	UMKC
4	RG-South

Illinois

5	JFK
6	Highland
7	Justice Center
8	Oxford
9	BlackBob



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